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Research Article

The effect of 8 weeks of aerobic exercise and papaya supplementation on lipid profile of men with fatty liver in Yazd city

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Abstract

Background: Today, researches have shown that the combination of some herbal supplements and doing sports exercises can have more effects on the recovery of some diseases. Therefore, the purpose of this research is to investigate the effect of eight weeks of aerobic training and papaya supplement consumption on the lipid profile of men with fatty liver.

Materials and Methods: The statistical population of the present study included all men with fatty liver in Yazd city, among whom there were 60 men with an average age of 25 to 35 years and a body mass index between 25 and 35 kg/m2, were randomly divided into four groups of 15 including aerobic exercise group, aerobic exercise group-papaya supplement, papaya supplement group and control group. The subjects of the training and training-supplementary group performed aerobic exercise according to the given program for eight weeks, three sessions per week and each session lasted for 70 minutes. In the same period, the supplement and training groups also received a papaya supplement in the form of capsules at a dose of 30 mg per kilogram of body weight every day after dinner. Karika Papaya Slim capsules produced in the Philippines in 2021 were prepared. Blood samples were taken from the subjects in the fasting state and at night, 72 hours before and after 8 weeks of training. Data analysis at the level of descriptive statistics using mean and standard deviation tests and at the level of inferential statistics after checking the normality of the data by the Shapiro-Wilk test. Two-way analysis of variance and Tukey's post hoc test were used. A significant level was considered in the current research ($P<0.05$) and all statistical steps were performed using spss25.

Results: he present study showed that eight weeks of aerobic training with papaya supplementation had a significant effect on serum levels of low-density lipoprotein (LDL), high-density lipoprotein (HDL), and triglycerides (TG) However, there was no significant change in the level of cholesterol (TC) ($P>0.05$).

Conclusion: Based on the results obtained from the present research, it is possible to use aerobic exercise and papaya supplement separately and especially simultaneously to improve the lipid profile of patients with fatty liver.

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1. Introduction

Along with obesity epidemics, fatty liver has become a global health risk. And according to the reports of the World Health Organization, overweight and obesity is the fifth cause of death in the world. (1) Clinical and demographic studies indicate that blood lipid disorders are the most important factors in the pathogenesis of cardiovascular diseases and type 2 diabetes. Blood lipid disorders are defined as an increase in the concentration of total cholesterol and low-density lipoprotein, high triglyceride levels, and a decrease in the concentration of high-density lipoprotein alone or together. (2) In line with the increase in the concentration of liver triglycerides in patients with (fatty liver) NAFLD, the lipid profile is also affected in patients, which is characterized by an increase in LDL levels and a decrease in HDL. (3) On the other hand, fat profile refers to different levels of fat in the blood, which are mostly reported as high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C) and triglycerides. High levels of LDL-C indicate excess fat in the blood, which in turn increases the risk of cardiovascular complications. HDL-C causes the transfer of fat to the liver for recycling and disposal, and high levels of HDL-C are an important indicator for heart health. It is vascular. HDL-C is actually an essential cholesterol that plays an important role in maintaining cholesterol homeostasis between arteries and organs and has an inverse relationship with the occurrence of coronary heart disease. Triglyceride is also a strong predictor of cardiovascular diseases and is one of the main lipids found in dietary fat.

Also, the linear and positive relationship between HDL-C and triglycerides with cardiovascular diseases has been confirmed (4).

Endurance sports training leads to a deep adaptation of the cardiorespiratory and neuromuscular systems, which increases the oxygen supply from the atmosphere to the mitochondria and more precisely regulates muscle metabolism (5).In recent times, the focus on plant research has increased around the world and a large number of evidences show the great potential of medicinal plants used in various traditional systems during these years fruits have been part of the human diet and food supplement. (6)

Carica papaya (Family: Carcaine) is a perennial herb that is traditionally used among the Yoruba tribe of Nigeria to treat various human and veterinary diseases including malaria, hypertension, diabetes mellitus, hypercholesterolemia, jaundice, intestinal worms. to be (7) Papaya Pharmacology and Activity Several previous studies have shown that papaya extract lowers blood sugar levels, which is thought to contain vitamin C, fiber, flavonoids, and saponins. In addition to being rich in nutrients, papaya fruit is a cheap and affordable fruit that is available throughout the year. (7) In previous studies (Abhi et al., 2021) and (Zetina et al., 2015), the present study colleagues observed a significant effect of papaya supplementation on LDL and HDL

And in other previous studies (Al Hasnain et al., 2020) and (Nonga and Abraka, 2013) in line with the present study, they observed a significant effect of papaya supplement on LDL, HDL, TG, and TC. Therefore, in the current research, the researcher investigated the effect of simultaneous use of endurance exercise and papaya supplement on the lipid profile of men with fatty liver.

2. Materials and Methods

The current research is an applied type that was conducted semi-experimentally. The statistical population of the present study included all middle-aged men with fatty liver in Yazd city, and 175 people volunteered to participate in the study through a call on social networks and by visiting medical centers Based on the entry and exit criteria, 60 people with an average age of 29.72 ± 3.38 were randomly selected as a sample and randomly divided into four groups: aerobic exercise, aerobic exercise-papaya supplement, papaya supplement and control group. they got. The criteria for entering the research included middle-aged men between 25 and 35 years old with fatty liver and no history of regular sports activity in the last year, and the criteria for exiting the present research was diagnosis of the disease (coronavirus) during the research period, taking medicine or other nutritional supplements. Yes, the consumption of alcohol and alcoholic beverages was before or during the course. . After obtaining the consent form and completing the health form from the subjects and complete explanations of the research process, the height and weight indices and BMI of all the subjects were measured and recorded. In the pre-test stage, they were introduced to Yazd Central and referred to blood sampling to measure lipid profile.The exercise and training groups performed exercises based on the training program for eight weeks, three sessions per week and each session lasted 70 minutes. Periodic aerobic and continuous aerobic exercises were performed on Sunday, Tuesday and Thursday. So that all the muscles active in these movements were trained in each session. The intense aerobic interval training program includes; Running with an intensity of 90-95% heart rate was intermittent in the form of 4-minute bursts (field on the track), which was repeated 4 times in each session, and 2-4 minutes of active rest was considered between the bursts. The program of continuous aerobic training included running with an intensity of 65 to 75% of the heart rate, intermittently in the form of 36-minute intervals (field on the track). It is necessary to mention that the intensity of intermittent and continuous aerobic exercises was applied based on the principle of increasing overload with an increase in the number of bouts or a gradual decrease in the recovery time between bouts. Meanwhile, the intensity of aerobic exercises was controlled using Borg's exercise pressure perception method. (8).

Supplemental and supplemental exercise groups received a daily papaya supplement of 30 mg per kilogram of body weight in capsule form one hour after dinner for eight weeks. (9) papaya supplement was prepared and used under the brand name Karika Papaya by Slim Company, made in the Philippines in 2021.

2. Results

In this research, in order to investigate the interactive effect of training and supplementation, a two-way ANOVA test with repeated measurements was used, and the results indicated that there is a significant difference between the research groups in TG, LDL, and HDL indices (Table 2). Tukey's test was used to investigate the location of the difference.

Table 2: The results of the variance analysis test based on the average lipid profile of different groups (P<0.05)

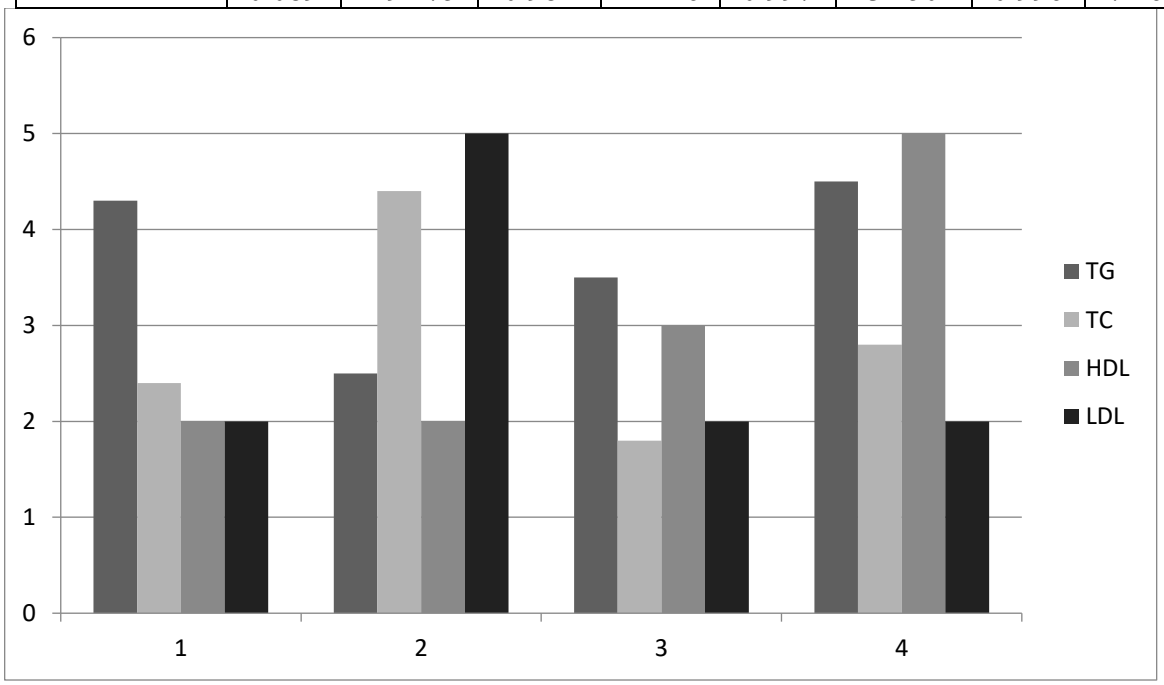
Variable	Mean square	sum of squares	ANOVA		
			df	f	Sig
TG	1948.575	93531.594	60	5.840	0.002
TC	2154.338	103408.234	60	0.551	0.650
LDL	101.543	4874.041	60	5.766	0.002
HDL	422.990	20303.533	60	4.129	0.011

The results of the present research showed that there is a significant difference in the mean serum level of LDL in men with fatty liver in the training group, papaya supplement group, and papaya-supplement-exercise group compared to the control group (p<0.05). In other words, all three independent variables in the current research have improved LDL in men with fatty liver. Also, the studies indicated that there is a significant difference in HDL serum level in men with fatty liver only in the exercise group and the papaya supplement group compared to the control group (p<0.05). On the other hand, no significant difference was observed in the serum level of triglycerides and cholesterol in the experimental groups compared to the control group (p>0.05) (Table 3) (Chart 1).

The results of the present study indicated that the simultaneous use of exercise and papaya supplement improved all the lipid profiles, but only the changes in the LDL index were statistically significant.

Table 3: Tukey's HSD test comparison results based on the average lipid profiles of different groups compared to the control group (P<0.05)

Groups	LDL		HDL		TC		TG	
	P	Mean	P	Mean	P	Mean	P	Mean
exercise	0.004	-34.593	0.024	11.836	0.983	-7.793	0.213	-34.551
Papaya	0.001	-37.252	0.001	14.771	0.909	-13.209	0.710	-17.519
Papaya exercise	0.000	-49.200	0.154	8.366	0.490	-29.358	0.133	37.933
Control	0.089	-19.175	0.984	-1.116	0.997	3.450	0.996	71.691



1.control 2. Training 3. Supplement 4. Training + Supplement

4. Discussion

The present study was conducted with the aim of investigating the effect of eight weeks of aerobic exercise and papaya supplement consumption on the lipid profile of men with fatty liver. In this research, 60 men with fatty liver were tested in four groups of 15 including aerobic exercise group, aerobic exercise group-papaya supplement, papaya supplement group and control group. A large volume of studies indicates the positive effects of regular exercise on the lipid profile, followed by an increase in age and a decrease in mortality due to diseases related to lipid profile factors.

Regular physical activity has a significant effect on fat status, and research has shown that regardless of endurance or strength, athletes have lower levels of TC, LDL-C, TG and higher levels of HDL-C. (10,11) Comparing the average of the pre-test and post-test groups, the values of triglycerides, cholesterol, HDL and LDL have improved, and it can be assumed that perhaps the increase in the duration of the training provided a significant possibility for the lipid profile(12).

In the previous studies in investigating the effect of water extract of Carica papaya on HDL and LDL and triglyceride and cholesterol levels in rats, it showed that it has a significant effect (13). in the study of the effect of papaya carica leaf extract on serum lipids of mice, consistent with the present study, observed a significant difference on HDL and LDL values and did not observe a significant difference on triglyceride (14).

In the studies of Abhi et al., 2021, in the study of the effect of papaya supplementation on mice, in line with the present study, they have observed a significant difference on HDL and LDL values. Al Hassanin et al., 2020, in the study of the effect of papaya leaves on the liver of mice, consistent with the current study, observed a significant difference on HDL and LDL values, and contrary to the current study, they observed a significant effect on triglyceride and cholesterol. The leaves of this plant contain many active compounds that increase the power of the body's antioxidant activities and reduce the level of lipid peroxidation. (15) And according to the antioxidant function, it is possible that the data are not significant due to the conditions of the samples and the duration of consumption and the level of triglycerides and blood cholesterol.

After eight weeks, the results of the research showed that there is a significant difference in the LDL serum level of men with fatty liver in the exercise and papaya supplement and exercise-papaya supplement groups compared to the control group ($p<0.05$). Also, the results of the research showed that there is a significant difference in HDL serum levels of men with fatty liver in the training and papaya supplement groups compared to the control group ($p<0.05$). On the other hand, there is no significant difference between the serum triglyceride and cholesterol levels of exercise and papaya supplement and exercise-papaya supplement groups compared to the control group ($p>0.05$) (Table 2).

Conclusion

According to the results obtained from the present research, it can be concluded that performing 8 weeks of aerobic exercise and papaya supplementation reduces LDL levels and increases HDL levels, and in general due to the improvement of low-density lipoprotein (LDL) and high-density lipoprotein (HDL) and Triglyceride (TG) can be a suitable treatment for non-alcoholic fatty liver disease in middle-aged men.

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Compliance with ethical standards

Conflict of interest None declared.

Ethical approval the research was conducted with regard to the ethical principles.

Informed consent Informed consent was obtained from all participants.

Author contributions

Conceptualization: L.R, A.F.B, S.A.H.M .; Methodology: L.R, A.F.B, S.A.H.M.; Software: L.R, A.F.B, S.A.H.M .; Validation: L.R, A.F.B, S.A.H.M .; Formal analysis: L.R, A.F.B, S.A.H.M .; Investigation: L.R, A.F.B, S.A.H.M .; Resources: L.R, A.F.B, S.A.H.M .; Data curation: L.R, A.F.B, S.A.H.M .; Writing - original draft: L.R, A.F.B, S.A.H.M .; Writing - review & editing: L.R, A.F.B, S.A.H.M Visualization: L.R, A.F.B, S.A.H.M .; Supervision L.R, A.F.B, S.A.H.M .; Project administration: L.R, A.F.B, S.A.H.M .; Funding acquisition: L.R, A.F.B, S.A.H.M ..

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